Siemens MMC (Pengerang Cogeneration Project) - UGE Neutralization Tank

Track record 2017

Location of application
Pengerang, Johor, Malaysia

Products/system used
Ceilcote® 242MR

Applicator
Hydra Admiral Engineering

Fabricator
MMC

Project size
1,200m²
Hes Obruk Hydro Power plant

Track record 2016

Location of application
Turkey

Products/system used
Internal system for Snail, Draft tube & Wicked gates
Polibrild® 705E @ 1,500μm

Project owner
Euaş Obruk Hes İşletmesi

Applicator
Enviroprotect A.Ş.

ISO12944 environment
C5 I

Project size
1,500m² (16,146ft²)

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Shepard Energy Station
Track Record 2014

Location of project
Calgary, Canada

Product/system used
Area 1 - Exterior
Interkote® 1560

Project owner
Enmax

Applicator
Park Derochie Inc

ISO12944 environment
C-5M

Surface preparation
SP-10

Total volume
1,176 lbs (553 kg)

Total area
approximately 300 sq ft (27.8 m²)
Adani Power Plant Project (SEZ)

Track record 2009

Location of project
Mundra, India

Products/system used
Power house building package
Interseal® 670HS @ 100μm
Interchar® 963 @ 500μm
Interthane® 990 @ 50μm

Project owner
Adani Power Limited

Applicator/Fabricator
Shandong TIEJUN Electric Power Engineering Co.LTD.

ISO12944 environment
C5-M

Project size
4,000MW

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pc.communication@akzonobel.com

AkzoNobel
Ranhill Powertron II 190MW Power Plant Water Tank

Track record 2010

Location of project
Kota Kinabalu, Sabah, Malaysia

Products/system used
Interseal® 670HS, Interthane® 990

Project owner
Ranhill Powertron II Sdn Bhd

Applicator
Strive Force Sdn Bhd

Fabricator
China National Electric Equipment Corporation

ISO12944 environment
C4

Total area
383m² (4,123ft²)

www.international-pc.com
pc.communication@akzonobel.com
Jimah 2 x 700MW
Coal Fired Power Plant

Track record 2008

Location of project
Port Dickson, Negri Sembilan, Malaysia

Products/system used
Ceilcote® 242MR Flakeline
Ceilcote 662 Flakeline

Project owner
Jimah Energy Venture Sdn Bhd

Applicator
Chemiekote Services Sdn Bhd

ISO12944 environment
C1

Total volume
2 units x 7,004 litres (1,540 gals)

Total area
2 units x 1,540m² (33,150ft²)

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pc.communication@akzonobel.com
Ginna Nuclear Generating

Track record 2010

Location of project
USA

Products/system used
Two coats Intergard® 264
One coat Intersleek® 731
One coat Intersleek 970

Project owner
Constellation Energy Group

Applicator/Fabricator
Constellation Fabrication and Paint Shop Baltimore, MD

ISO 12944 environment
C-5 Immersion

Total area
6 steel heater racks MC 10” channels
Ranhill Powertron II 190MW Combined Cycle Power Project

Track record 2010

Location of project
Sabah, Malaysia

Project owner
Ranhill Powertron II Sdn. Bhd.

Applicator

ISO12944 environment
C4

Total area
1,910m² (20,559ft²)

Diesel tanks (1,650m²)
Products/system used
Intergard® 251 (Red)
Interseal® 670HS (Grey)
Interthane® 990 (Yellow)

Water tanks (260m²)
Products/system used
Interseal 670HS (Grey)
Interseal 670HS (Red)
Interthane 990 (Green)

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AkzoNobel
**Charter Street Biomass Power Plant**

**Track record 2011**

<table>
<thead>
<tr>
<th>Location of project</th>
<th>Engineer</th>
<th>ISO12944 environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madison, USA</td>
<td>AECOM</td>
<td>C4</td>
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</table>

<table>
<thead>
<tr>
<th>Products/system used</th>
<th>Applicator</th>
<th>Surface preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural steel</td>
<td>Profile Finishing</td>
<td>SP 6</td>
</tr>
<tr>
<td>Interlac® 789 (4μm)</td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Project owner</th>
<th>Fabricator</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Wisconsin</td>
<td>Skyline Steel</td>
</tr>
</tbody>
</table>

**Total area**

18,581 m² (200,000 ft²)
Siemens Dewatering Bins

Track record 2011

Location of project
USA

Products/system used
Dewatering bins and support steel
Interline® 850 @ 100-150 mils (4-6 μm)
Interline 850 @ 100-150 mils (4-6 μm)

Project owner
Siemens Rothschild Wisconsin

Applicator
Quality Sandblasting

Engineer/Fabricator
Siemens

ISO12944 environment
Immersion

Total volume
250 litres (350 gals)

Total area
9,800m² (25,000ft²)
Bear Gardens

Location of project
New Canton, Virginia, USA

Products/system used
Area 1 - Exterior Steel
Interzinc® 52 @ 2-3 μm (50-75 mils)
Intergard® 475HS @ 4-8 μm (100-200 mils)
Interthane® 990HS @ 2-3 μm (50-75 mils)

Area 2 - Interior Lining
Interline® 850 @ 4-6 μm (100-150 mils)
Interline 850 @ 4-6 μm (100-150 mils)
Interline 850 @ 4-6 μm (100-150 mils)

Project owner
Dominion Power

Engineer
Fluor

Applicator
Carolina Industrial/Fisher Tank

Fabricator
Fisher Tank

ISO12944 environment
C4

Total area
5,574m² (60,000ft²)

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AkzoNobel
Tumut 3 power station spiral casing & draft tube

Track record 2007

Location of project
Tumut, Australia

Products/system used
Interline® 982, Interline 975

Project owner
Snowy Mountains Hydro Electric Authority

Applicator
McElligott Partners Pty Ltd

ISO12944 environment
Immersed conditions (tank lining)

Total volume
200 litres (77 gals)

Total area
500m² (5,300ft²)
Rabigh Oil Fired Power Station
Track record 2011

Location of project
Saudi Arabia

Products/system used
Ceilcote® 370HT, Intertherm® 50, Intergard® 475HS, Ceilcote® 282HB, Interzinc® 22, Interthane® 990

EPC contractor
Doosan

Packages
Structural steel, tanks and passive fire protection

Capacity
2,800MW

Total volume
500,000 litres + passive fire protection

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Breitburn Energy Diatomite Module 2 Project, T-640 Tank

Track record 2012

Location of project
USA

Products/system used
Area 1 - Exterior
(shell to be insulated)
Bar-Rust® 233H
Devthane® 378H

Area 2 - Tank interior
Enviroline® 405HT LV
Enviroline® 405HT

Project owner
Breitburn Energy

Applicator
West Coast Industrial Coatings Inc.

ISO12944 environment
C3

Surface preparation
SSPC-SP5

Total volume
947 litres (250 gallons)

Total area
928m² (9,980ft²)

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Manzanillo 1 & 2 upgrade
Conversion from a Coal Fired Power Plant to a Gas Fired Power Plant

Track record 2012

Location of project
Mexico

Areas coated
Neutralization pits, trenches, stacks

Products/system used
Ceilcote® 2000MR Flakeline,
Intertherm® 751 CSA,
Interthane® 990, Interseal® 670HS,
Interprime® 539, Intergard® 251,
Intertuf® 262

Capacity
600MW

Project owner/Utility
CFE

Main contractor
Dragados

ISO12944 environment
CS-M - Coastal

Total volume
15,000 litres (3,963 gals)

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La Yesca Hydroelectric Plant

Track record 2012

Location of project
Tepic, Nayarit, Mexico

Plant type
Hydroelectric

Capacity
750MW

Areas coated
Gates (dry side), high pressure pipe line (interior), turbine power generation components, grids

Products used
Interthane® 990, Interseal® 670HS, Interlac® 665, Interzone® 485, Interprime® 198, Intertuf® 262

Project owner/Utility
CFE

ISO12944 environment
C4

Total volume
30,000 litres (6,600 gals)

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I.I.A. Honduras
Hydroelectric Pipelines
Track record 2013

Location of project
Honduras

Products/system used
Envirole® 376F-Fast, Interzone® 954

Project owner/applicator
I.I.A.

ISO12944 environment
C4, C5i

Project size
20,000m² (215,278ft²) each pipeline

www.international-pc.com
pc.communication@akzonobel.com
Chana 2 CCGT Power Plant
Track record 2013

Location of project
Thailand

Area coated
Cooling water piping

Pipe cargo
Brackish water/Sea water

Products/system used
Intershield® 300, Intersleek® 737,
Intersleek® 970 (internals),
Interzinc® 22 (externals)

Project owner
Electricity Generating Authority of Thailand (EGAT)

Paint purchaser
Siemens Power

Plant type
Combined Cycle Gas Turbine (CCGT)

Capacity
800MW

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pc.communication@akzonobel.com
PH Reventazon
Track record 2013

Location of project
Costa Rica

Project owner/applicator
ICE

Products/system used
Area 1
Interzinc® 52 @ 76μm (3 mils)
Intergard® 475HS @ 152μm (6 mils)
Interfine® 979 @ 152μm (6 mils)

Area 2
Interzone® 954 @ 508μm (20 mils)

ISO12944 environment
C4

Total area
80,000m² (861,113ft²)

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The water outlet pipes were inspected in 2012, after 7 years service, and the Intersleek system showed excellent foul release performance. There was only a thin layer of slime which could easily be cleaned off. The life of the outlet pipes before maintenance was required was extended from every 1-2 years to every 8-10 years.

System: Intergard® 740 @ 50μm (2 mils)
Intershield® 300 @ 125μm (5 mils)
Intersleek 737 @ 100μm (4 mils)
Intersleek 757 @ 150μm (6 mils)
Case study 2012

Background
After over 30 years in service, several of the plant’s below-ground concrete water tanks were showing signs of degradation. Despite regular maintenance, the existing two-coat fibre reinforced coating had detached in some areas, exposing the concrete substrate and reducing cover. Being underground, the environment was damp, with poor ventilation. Fast-return-to-service was a priority, so there was insufficient time to dry the substrate out, a pre-requisite for conventional coating systems.

The solution
Intercrete offered a complete water-based system for the repair and long term protection of these assets. The surface was hydroblasted to remove the old coating and any damaged concrete. Any exposed rebar was treated with Intercrete 4871 to prevent further corrosion. Large voids were filled with Intercrete 4802 rapid-setting repair mortar and the remaining substrate reprofiled using polymer modified fairing coat Intercrete 4820. Finally, Intercrete 4840 high performance epoxy modified cementitious coating was spray-applied in two coats of 1mm, providing a durable solution.

With its tolerance to damp environments and easy application, Intercrete provided the ideal fast-return-to-service solution for the customer in this situation.

Focus products: Intercrete™ 4802, Intercrete 4820, Intercrete 4840
Location: Pocerady, Czech Republic
Contractor: Česká Voda (Czech Water), part of the Veolia Group
Project size: 2,100m²
Hongyanhe Nuclear Plant piping

Track record 2010

Location of project
Dalian City, China

Products/system used
2 x Interzone® 954 @ 400μm (16 mils)

Project owner
CGNPC (China Guangdong Nuclear Power Group)

Applicator
Shenzhen Liwei Anti-corrosion and Thermal Insulation Technology Co. Ltd

Fabricator
Jiangsu Power Equipment Co. Ltd

ISO12944 environment
IM3
Kildal Kraft Verk

Track record 2013

Location of project
Sørkjosen, Norway

Project owner
Ymber

Products/system used
Outside
Interplus® 356, Interthane® 870

Inside
Interzone® 954

Total area
8,000m² (86,111ft²)
<table>
<thead>
<tr>
<th>Location of project</th>
<th>Products/system used</th>
<th>Specifier</th>
<th>Total volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyprus</td>
<td>Interzinc® 22, Interzinc® 52, Interline® 850, Interline® 399, Intergard® 345, Intergard® 475HS, Interseal® 670HS, Interthane® 990, Intergard® 475HS, Interseal® 670HS,</td>
<td>J&amp;P Overseas</td>
<td>60,000 litres (13,198 gals)</td>
</tr>
<tr>
<td>Project owner</td>
<td></td>
<td>Applicator</td>
<td>Total area</td>
</tr>
<tr>
<td>National Electric Corporation of Cyprus-AHK</td>
<td></td>
<td>Enbit Greece/Cyprus</td>
<td>200,000m² (2,152,782ft²)</td>
</tr>
</tbody>
</table>

**Total volume**: 60,000 litres (13,198 gals)

**Total area**: 200,000m² (2,152,782ft²)
Boufarik Stack Project

Track record 2014

Location of project
Turkey

Products/system used
System for Stack - Internal
Intergard® 251 @ 70μm (2.8 mils) dft

System for Stack - External
Interzinc® 22 @ 80μm (3.1 mils) dft
Intertherm® 50 @ 25μm (1 mil) dft
Intertherm® 50 @ 25μm (1 mil) dft

System for Structural Steel - External
Intergard® 251 - 50μm (2 mils) dft
Intergard® 475HS - 80μm (3.1 mils) dft
Interthane® 870 - 70μm (2.8 mils) dft

Project owner
Enpro Mühendislik Müşavirlik Taahhüt ve Dış Tic. A.Ş.

Applicator
Bafor Steel

ISO12944 environment
C5-I Heavy Industrial (High Durability)

Project size
11,900m² (128,090ft²)
6,000 litres (1,585 gals)
Eren Enerji FGD Stack
Track record 2014

Location of project
Turkey

Products/system used
System for FGD Stack - Internal
Ceilcote® 282HB - 600μm (23.6 mils) DFT
Ceilcote® 282HB - 750μm (29.5 mils) DFT

Project owner
Eren Enerji Elektrik Üretim A.Ş.

Applicator
Bakım Mühendislik

ISO12944 environment
C5-I very high industrial

Project size
6,500m² (69,965ft²)
Ash handling conveyors

Track record 2014

Location of project
Italy

Products/system used
Interzinc® 22, Interzinc® 42, Intertherm® 50, Intertherm® 228

Project owner
Magaldi

ISO12944 environment
C4 - C5I

Total volume
30,000 litres (6,599 gals)
Puma Energy Mackay Terminal

Track record 2014

Location of project
Australia

Products/system used
Interzinc® 52 @ 75μm (3 mils)
Interplus® 1180 @ 200μm (8 mils)
Interthane® 990 @ 75μm (3 mils)

Project owner
Puma Energy Mackay Terminal

Applicator
IPCQ

Fabricator
CBI

ISO12944 environment
C5

Total area
6 Tanks
(5 @ 25m x 27m; 1 @ 25m x 20m)
Te Mihi Geothermal Power Station

Location of project
Taupo, New Zealand

Main contractors
McConnell Dowell, Parsons Brinkerhoff, SNC - Lavalin Joint Venture

Project size
40,000m² (430,556ft²)

Products/system used
Structural steelwork
Interzinc® 42, Interplus® 1180, Interthane® 990

Intumescent
Interzinc® 42, Interchar® 963, Interthane® 990, Inter cure® 200, Interchar® 212

Structural steel applicators
Gritblast, Counties Industrial Coatings, Auckland Abrasive Blasting Coatings, Taupo Coating Specialists

Intumescent applicators:
Gritblast, Auckland Abrasive Blasting Coatings, Taupo Coating Specialists
Lausward Gas and Steam Power Plant

Track record 2014

Location of project
Düsseldorf, Germany

Products/system used
Interzinc® 52 and Intergard® 345

Project owner
Stadtwerke Düsseldorf

Specifier
Siemens AG

Applicator
ZÜBLIN Stahlbau

ISO12944 environment
C4

Total volume
40,000 liter (10,567 gals)

Project size
60,000m² (645,835ft²)
Eren Energy Power Plant FGD Stack Relining

Case history 2015

FGD Stack lining area Inspection/Interplan™ carried out at Eren Energy Power plant on April 2014. High corrosive activity, blistering failures and detachment failures observed on 6,500m² FGD stack walls Internal surfaces.


After one year, first corrosion inspection performed by AkzoNobel Protective Coatings Technical Service on May 2015. These pictures show the coating was still very well after one year in service and there was no evidence of corrosion. This practically demonstrates the abrasion, chemical and heat resistance of Ceilcote 282HB in a coal power plant (FGD Stack) environment.

“IT was not easy to perform perfect surface preparation and old, damaged steel was corroded with acids. After one year, Ceilcote 282HB was in good condition and was still tolerating low surface preparation quality.”
 Siemens GAD Tank Lining
Track record 2015

Location of project
Turkey

Products/system used
Internal System - Tank Lining:
Interline® 975 @ 2x200µm (8 mils)

External System -
Primer: Interzinc® 52 @ 70µm (3 mils)
Stripe coat: Interseal® 670HS @ 70µm (3 mils)
Mid coat: Intergard® 475HS @ 120µm (5 mils)
Top coat: Interthane® 990 @ 50µm (2 mils)

Project owner
Siemens CCPP Bandırma II

ISO12944 environment
C5-I

Total area
Internal 2,000m² (21,528ft²)
External 2,000m²
GAD Tank Lining Project
Case study 2015

Background
Inspection/Interplan™ carried out at CCPP Power plant on August 2015. Design failures observed between tank roof internal steel supports and roof plates as seen in photos.

The solution
It was reported about problem and issue on the roof support construction of the tank. There are gaps between support structures and roof plates, which were not possible to properly fill with coatings. These gaps may lead to premature coatings failure due to crevice corrosion. To prevent such case we would like to advise Intercrete tape application, below system;
Surface preparation: SSPC SP11 – corroded areas (roughening with coarse sand papers on to Interline 975 applied surfaces).
MR system: Intergard® 821 to fill gaps between supports and roof plates.
For tape application: Intercrete 4840 epoxy copolymer primer.
Intercrete 4872 tape.
Intercrete 4842 polymer modified elastomeric cementious coating.

Corrosion risk of desing failure were taken under control by coating with Intercrete 4872 tape system.

Customer and applicator were satisfied about application and technical trainee of Intercrete 4872 tape sealing system.
KHOMS - 2x275MW GE 9FA Gas Turbine Project

Track record 2015

Location of project
Turkey

Products/system used
System for structural steel
Interzinc® 22 @ 60µm (2 mils)
Interseal® 1052 @ 185µm (7 mils)
Interthane® 990SG @ 75µm (3 mils)

Project owner
Calik Enerji

Applicator
KEMPAZ ENDUSTRI
SAN. VE TIC. A.S.

ISO12944 environment
C5

Project size
45,000m² (484,376ft²)

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Natural Gas Power Plant 770mw - Water treatment concrete lining

Track record 2014

Location of project
Turkey

Products/system used
System for concrete surface -
Intercrete™ 4820 @ 2,000μm (80 mils)
Ceilcote® 2000 MR @ 3,000μm (120 mils)

Project owner
Ankara Natural Gas Power Plant

Applicator
Bakım Mühendislik

ISO12944 environment
C5-I

Project size
600m² (6,458ft²)

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Demineralized Water and Fire Water Tank Lining

Track record 2015

Location of project
Turkey

Products/system used
- Demineralized water tank - internal system
  2 x coats Interline® 850 @ 125μm
- Fire water tank - internal system
  2 x coats Interseal® 670HS @ 125μm

Project owner
Taha Natural Gas Power Plant

Applicator
Uyarlar Kumlama ve Boyama A.Ş.

Project size
1,000m² (10,764ft²)
Gama Khabat Thermal Power Plant  Stack Lining

Track record 2015

Location of project
Turkey

Products/system used
Internal system for structural steel - 2 coats Ceilcote® 282HB @ 750μm

Applicator
Çelkonsan A.S.

ISO12944 environment
C5

Project size
2,300m² (24,757ft²)
Aksa Akrilik FGD Lining
Track record 2016

Location of project
Turkey

Products/system used
Ceilcote® 282HB 2x750μm (60 mils)

Project owner
Aksa Akrilik Kimya Sanayi AS

Applicator
Bakım Mühendislik

Project size
750m² (8,073ft²)
Kemerköy Thermal Power Plant

Case history 2016

Kemerköy Thermal Power Plant is located in Muğla, south-western Turkey and it consists of three units, each with a capacity of 210MW. The construction of the plant took place between 1984 and 1993 with two of the units becoming operational in 1994 and the third one in 1995. The annual nominal production capacity of the plant is 4 billion 95 million KWh.

In 2006 the flue gas desulphurization (FGD) units of the Kemerköy plant were coated with the following products: Ceilcote 282, Ceilcote 232, Ceilcote 140 and Ceilcote 180.

In March 2016, 10 years after the application, the first corrosion inspection performed by IP Protective Coatings Technical Service. The inspection showed that the coatings were performing extremely well and the coated surfaces were in a perfect condition with no evidence of corrosion or abrasion.

This practically demonstrates the abrasion, chemical and heat resistance of our Ceilcote products in a thermal power plant (FGD unit) environment.

Focus product: Ceilcote® 282HB FGD linings
Year of project: 2006
Location: Muğla, Turkey
Type of project: FGD unit lining
Project size: 20,000m² (215,278ft²)